

# California M E D I C I N E

## EDITORIAL

### Cobalt Bombs

THERE HAS BEEN some discussion in the popular press in recent months of the possibilities of improved control of cancer by the use of large sources of radioactive cobalt. When such large sources are used, they require enclosure in a heavy tube or tank, sometimes called a "bomb" or "cannon."

The theoretical advantages of cobalt are that the metal is more readily available and less expensive than radium. Further, if the cost of the activating pile (perhaps \$25 million) is not considered, radioactive cobalt should be less expensive than existing types of "x-ray bombs" or "cannons" (that is, of 1 or 2 thousand kilovolt apparatus). Some believe that the cobalt bomb will permit more accurate tumor dosage and more effective techniques than are possible with high voltage x-ray equipment. Finally, the commonly planned beam of the cobalt unit is an almost monochromatic one, with a mean energy of about 1.2 million electron volts.

Most of the above advantages are more theoretical than real. In actual fact, cobalt-60 is not, at present, readily available. Further, the small plaques or slugs of cobalt require many months' exposure at the Canadian atomic pile at Chalk River to become suitably radioactive without at the same time causing undue interference with the other work going on at that center. Theoretically, a source of radioactive cobalt amounting to 1,000 curies could be made in about one year at Chalk River, but in actual fact it has taken longer. Indeed, the pile had to be shut down for a certain period because of contamination difficulties. Finally, practicing radiologists have more difficulty at present in securing radioactive cobalt than they do in obtaining naturally radioactive radium or high-voltage x-ray apparatus.

Additional disadvantages to any large amounts of artificial or natural radioactive material set up for use in the form of bombs or cannons are the very

heavy shielding required and the necessarily cumbersome nature of the unit. The walls of treatment rooms have to be enormously thick and the doors of vast weight.

One final problem involved in radioactive cobalt is the relatively short half life of this substance (approximately 5.3 years as compared with 1,750 years for radium). This means that while one might start with a 100 curie cobalt bomb, it would be down to an effectiveness of about 52 curies in five years. This would necessitate lengthening treatment times progressively during the life of the bomb. Some workers suggest that cesium-137, which has a half life of 33 years, would be the "most economical and desirable isotope for teletherapy" (Brucer). Unfortunately, no large source of that element has yet been made available for therapy.

It is important to remember that radiologists have been using rays of various energies in the treatment of cancer since 1895. Radium has been available since 1901. X-ray tubes producing rays with energies of a million volts and more have been in use

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since the early 1930's. The radiations coming from radioactive cobalt are of the same type as those coming from radium and x-ray tubes. To date no one has proved that there is any curative power in the gamma rays from radium that does not exist in x-rays, and there is no reason to expect that the gamma rays from cobalt will do anything more than the gamma rays from radium. However, for certain tumor sites there may be some technical advantages in using radioactive cobalt rather than radium or high-energy x-rays.

Treatment with cobalt bombs is *not* generally available in this country at present. However, treatment with other types of ray-emitting units, both

radium and x-ray, is widely available. Further, radiotherapists with equipment adequate for treating the majority of cases of cancer are at hand in most large American communities today.

In summary, therefore, radioactive cobalt bombs for medical use are still very much in the experimental stage. The type of rays emitted by these bombs does not act on cancer cells in any manner significantly different from that of filtered rays obtained from other more available x-ray and radium sources. Therefore, at least for the present, physicians treating cancer by radiological methods will continue to place major dependence on properly calibrated x-ray and radium therapy apparatus.

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## LETTERS to the Editor . . .

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July 11, 1952

REFERENCE is made to the article by Dr. Frank Hinman, Jr., which appeared in the January 1952 issue of CALIFORNIA MEDICINE.

On page 3 of this article, the following statement appears:

"Aureomycin, chloramphenicol and Terramycin are similar in antibacterial and other properties. In fact, it may be that chloramphenicol (which has been synthesized) is merely an active portion of the large Terramycin molecule."

The very extensive studies which have been carried out by our chemists have shown that, chemically, Terramycin differs radically from chloramphenicol, nor is the chloramphenicol molecule a component part of the Terramycin molecule. Of particular importance is the fact that Terramycin does not contain a nitrobenzene radical.

We are taking the liberty of bringing these facts to your attention since we are certain that you would not wish to have erroneous information go uncorrected.

Sincerely yours,

W. ALAN WRIGHT, M.D.

Director of Medical Service,  
Chas. Pfizer & Co., Inc.

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• *Dr. Wright's letter was referred to Dr. Hinman, who replied:*

The detailed chemical pattern of Terramycin had not been published at the time the article was written, and it is now apparent that the two substances are structurally unrelated, especially by the absence of the nitrobenzene radical in Terramycin. This correction is timely since chloramphenicol has very recently received adverse publicity related to aplastic anemia.

FRANK HINMAN, JR., M.D.